

Claims

What is claimed is:

1. A speech recognition system for recognizing spoken input received from a source of the spoken input coupled to the speech recognition system wherein the speech recognition system comprises:
- input means for receiving the spoken input from the source of the spoken input; and
 - processing means coupled to the input means for performing a first pass speech recognition technique on the spoken input and for forming first pass results wherein the processing means selectively performs a second pass speech recognition technique on the spoken input according to the first pass results.
2. The speech recognition system according to claim 1 wherein the first pass results identify a speech expression as corresponding to the spoken input with a corresponding score.
3. The speech recognition system according to claim 2 wherein when the score corresponding to the speech expression exceeds a predetermined threshold, the second pass speech recognition technique is not performed and when the score corresponding to the speech expression does not exceed the predetermined threshold, the second pass speech recognition technique is performed.
4. The speech recognition system according to claim 3 wherein the second pass speech recognition technique selects one of the speech expressions identified by the first pass results as corresponding to the spoken input.

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1 5. The speech recognition system according to claim 1 wherein the first pass
2 results includes a graph that represents a number of alternative speech expressions.

1 6. The speech recognition system according to claim 1 wherein the first pass
2 results include alignments of speech and silence of the spoken input and wherein when the
3 second pass speech recognition technique is performed, the second pass speech recognition
4 technique does not process at least some portions of the spoken input which are aligned to
5 silence.

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1 7. The speech recognition system according to claim 1 wherein a first pass speech
recognition technique for a sentence received after the spoken input is omitted based upon
results selected from the group consisting of the first pass results and a result of the second
pass speech recognition technique.

1 8. The speech recognition system according to claim 1 wherein a first pass speech
recognition technique for a sentence received after the spoken input is selected based upon
results selected from the group consisting of the first pass results and a result of the second
pass speech recognition technique.

1 9. The speech recognition system according to claim 1 wherein the first pass
2 results identify a plurality of speech expressions as corresponding to the spoken input with
3 each speech expression having a corresponding score.

1 10. The speech recognition system according to claim 9 wherein when a difference
2 between two highest of the scores exceeds a predetermined threshold, then the second pass
3 speech recognition technique is not performed and when a difference between the two highest

4 A scores does not exceed a predetermined threshold, then the second pass speech recognition
5 technique is performed.

1 11. The speech recognition system according to claim 10 wherein the second pass
2 speech recognition technique selects one of the speech expressions identified by the first pass
3 results as corresponding to the spoken input.

1 12. The speech recognition system according to claim 1 wherein a characteristic of
2 the spoken input is identified based upon the first pass results.

13. The speech recognition system according to claim 12 wherein the second pass
speech recognition technique is selected from a plurality of speech recognition techniques
according to the characteristic of the spoken input identified by the first pass.

14. The speech recognition system according to claim 13 wherein the second pass
speech recognition technique is selected while the spoken input is still being received by the
input means from the source of the spoken input.

15. The speech recognition system according to claim 13 wherein the second pass
speech recognition technique is performed after the spoken input is received by the input
means from the source of the spoken input.

1 16. The speech recognition system according to claim 13 wherein the characteristic
2 of the spoken input is gender of a speaker of the spoken input.

17. The speech recognition system according to claim 13 wherein the characteristic of the spoken input is a type of telephone channel a speaker of the spoken input is calling from.

18. The speech recognition system according to claim 17 wherein the type of telephone channel is hands-free or not hands-free.

19. The speech recognition system according to claim 1 wherein the first pass results identify the spoken input as being in one of the following three categories: (1) originating from a female speaker; (2) originating from a male speaker; and (3) originating from a hands-free telephone where a speaker of the spoken input is female or male.

20. The speech recognition system according to claim 1 wherein the first pass speech recognition technique attempts to select the second pass speech recognition technique as an appropriate one of a plurality of speech recognition techniques.

21. The speech recognition system according to claim 20 wherein when the first pass speech recognition technique is not successful in determining which of the plurality of speech recognition techniques is most appropriate, multiple ones of the plurality of speech recognition techniques are performed.

22. The speech recognition system according to claim 1 wherein the first pass results identify an alignment associated with the spoken input.

23. The speech recognition system according to claim 22 wherein a plurality of speech recognition techniques are performed on a selected portion of the spoken input wherein the selected portion is selected based upon the alignment associated with the spoken input.

1 24. The speech recognition system according to claim 23 wherein each of the
2 plurality of speech recognition techniques forms a score corresponding to the selected portion
3 of the spoken input.

1 25. The speech recognition system according to claim 24 wherein the second pass
2 speech recognition technique is a selected one of the plurality of speech recognition
3 techniques having a highest corresponding score.

1 26. The speech recognition system according to claim 23 wherein the selected
2 portion of the spoken input is a phoneme.

3 27. A method of recognizing spoken input received from a source of the spoken
4 input wherein the method comprises steps of:

- a. receiving the spoken input from the source of the spoken input;
- b. performing a first pass speech recognition technique on the spoken input;
- c. forming first pass results; and
- d. selectively performing a second pass speech recognition technique on the
spoken input according to the first pass results.

1 28. The method according to claim 27 wherein the first pass results include
2 alignments of speech and silence of the spoken input and wherein when the second pass
3 speech recognition technique is performed, the second pass speech recognition technique does
4 not process at least some portions of the spoken input which are aligned to silence.

1 29. The method according to claim 27 wherein the first pass speech recognition
2 technique is selected from among a plurality of available first pass speech recognition
3 techniques.

30. The method according to claim 29 wherein the first pass speech recognition technique is selected from among the plurality of available first pass speech recognition techniques based upon prior spoken input.

31. The method according to claim 29 wherein the first pass speech recognition technique is selected from among the plurality of available first pass speech recognition techniques based upon information obtained regarding a speaker of the spoken input.

32. The method according to claim 27 wherein the first pass results identify a speech expression as corresponding to the spoken input with a corresponding score.

33. The method according to claim 32 wherein when the score corresponding to the speech expression exceeds a predetermined threshold, the second pass speech recognition technique is not performed and when the score corresponding to the speech expression does not exceed the predetermined threshold, the second pass speech recognition technique is performed.

34. The method according to claim 27 wherein the first pass results identify a plurality of speech expressions as corresponding to the spoken input with each speech expression having a corresponding score.

35. The method according to claim 34 wherein when a difference between two highest of the scores exceeds a predetermined threshold, then the second pass speech recognition technique is not performed and when a difference between the two highest scores does not exceed a predetermined threshold, then the second pass speech recognition technique is performed.

36. The method according to claim 35 wherein the second pass speech recognition technique selects one of the speech expressions identified by the first pass results as corresponding to the spoken input.

37. The method according to claim 27 wherein a first pass speech recognition technique for a sentence received after the spoken input is omitted based upon results selected from the group consisting of the first pass results and a result of the second pass speech recognition technique.

38. The method according to claim 27 wherein a first pass speech recognition technique for a sentence received after the spoken input is selected based upon results selected from the group consisting of the first pass results and a result of the second pass speech recognition technique.

39. The method according to claim 27 wherein the first pass results identify a characteristic of the spoken input.

40. The method according to claim 39 wherein the second pass speech recognition technique is selected from a plurality of speech recognition techniques according to the characteristic of the spoken input identified by the first pass.

41. The method according to claim 40 wherein the characteristic of the spoken input is gender of a speaker of the spoken input.

42. The method according to claim 40 wherein the characteristic of the spoken input is a type of telephone channel a speaker of the spoken input is calling from.

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1 43. The method according to claim 42 wherein the type of telephone channel is
2 hands-free or not hands-free.

1 44. The method according to claim 27 wherein the first pass results identify the
2 spoken input as being in one of the following three categories: (1) originating from a female
3 speaker; (2) originating from a male speaker; and (3) originating from a hands-free telephone
4 where a speaker of the spoken input is female or male.

1 45. The method according to claim 27 wherein the first pass speech recognition
2 technique attempts to select the second pass speech recognition technique as an appropriate
3 one of a plurality of speech recognition techniques.
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5 46. The method according to claim 45 wherein when the first pass speech
6 recognition technique is not successful in determining which of the plurality of speech
7 recognition techniques is most appropriate, multiple ones of the plurality of speech recognition
8 techniques are performed.

9 47. The method according to claim 27 wherein the first pass results identify an
10 alignment associated with the spoken input.

11 48. The method according to claim 47 wherein a plurality of speech recognition
12 techniques are performed on a selected portion of the spoken input is selected based upon the
13 alignment associated with the spoken input.

1 49. The method according to claim 48 wherein each of the plurality of speech
2 recognition techniques forms a score corresponding to the selected portion of the spoken
3 input.

1 ~~4~~ 50. The method according to claim 49 wherein the second pass speech recognition
2 technique is a selected one of the plurality of speech recognition techniques having a highest
3 corresponding score.

1 51. The method according to claim 48 wherein the selected portion of the spoken
2 input is a single phoneme.

1 52. A method of recognizing spoken input received from a source of the spoken
2 input wherein the method comprises steps of:
3 a. receiving the spoken input from the source of the spoken input;
4 b. performing a first pass speech recognition technique on the spoken input;
5 c. forming first pass results wherein the first pass results identify a speech
6 expression as corresponding to the spoken input with a corresponding score and
7 also identify a characteristic of the spoken input; and
8 d. performing a second pass speech recognition technique on the spoken input
9 when the corresponding score is below a predetermined threshold and wherein
10 the second pass speech recognition technique is selected from a plurality of
11 speech recognition techniques according to the identified characteristic.

1 53. The method according to claim 52 wherein the characteristic of the spoken
2 input is gender of a speaker of the spoken input.

1 54. The method according to claim 52 wherein the characteristic of the spoken
2 input is a type of telephone channel a speaker of the spoken input is calling from.

1 55. A method of recognizing spoken input received from a source of the spoken
2 input wherein the method comprises steps of:
3 a. receiving the spoken input from the source of the spoken input;
4 b. performing a first pass speech recognition technique on the spoken input;
5 c. forming first pass results wherein the first pass results identify a plurality of
6 speech expressions as corresponding to the spoken input each speech expression
7 having a corresponding score and also identify a characteristic of the spoken
8 input; and
9 d. performing a second pass speech recognition technique on the spoken input
10 when a difference between two highest of the scores does not exceed a
11 predetermined threshold and wherein the second pass speech recognition
12 technique is selected from a plurality of speech recognition techniques
13 according to the identified characteristic.

14 56. The method according to claim 55 wherein the characteristic of the spoken
15 input is gender of a speaker of the spoken input.

16 57. The method according to claim 55 wherein the characteristic of the spoken
17 input is a type of telephone channel a speaker of the spoken input is calling from.

18 58. A method of recognizing spoken input received from a source of the spoken
19 input wherein the method comprises steps of:
20 a. receiving the spoken input from the source of the spoken input;
21 b. selectively performing a first pass speech recognition technique on the spoken
22 input based upon a result of a speech recognition technique performed on prior
23 spoken input from the source; and
24 c. performing a second pass speech recognition technique on the spoken input.

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1 59. A method of recognizing spoken input received from a source of the spoken
2 input wherein the method comprises steps of:

- 3 a. receiving the spoken input from the source of the spoken input;
4 b. selectively performing a first pass speech recognition technique on the spoken
5 input based upon information obtained regarding a speaker of the spoken input;
6 and
7 c. performing a second pass speech recognition technique on the spoken input.

1 60. A method of recognizing spoken input received from a source of the spoken
2 input wherein the method comprises steps of:

- 3 a. receiving the spoken input from the source of the spoken input;
4 b. selectively modifying a first pass speech recognition technique to be performed
5 on the spoken input based upon a result of a speech recognition technique
6 performed on prior spoken input from the source; and
7 c. performing the first pass speech recognition technique on the spoken input.

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